Staff Report
for

Item 7
October 28, 2004

To: John H. Robertus
Executive Officer

From: Hashim Navrozali
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Industrial Compliance Unit

Tentative Order No. R9-2004-0154
NPDES Permit No. CA0001368

WASTE DISCHARGE REQUIREMENTS

FOR

DUKE ENERGY SOUTH BAY, LLC
SOUTH BAY POWER PLANT
SAN DIEGO COUNTY

DISCUSSION

Duke Energy South Bay LLC, South Bay Power Plant (SBPP) is a natural gas fueled steam electric power generating station that began operation in 1960. The facility is located at 990 Bay Boulevard, Chula Vista, California, on the southern edge of San Diego Bay. This 150-acre, 737-gross megawatt (MW) plant is located in Section 9, T18S, R2W SBBM.

Tentative Order No. R9-2004-0154 (*Waste Discharge Requirements Duke Energy South Bay, LLC, South Bay Power Plant, San Diego County*) renews and updates NPDES Permit No. CA0001368 and supersedes the current NPDES permit, Order No. 96-05, in its entirety. The tentative Order includes waste discharge requirements for the combined discharge of up to 601.13 million gallons per day (MGD) of elevated temperature once-through cooling water and other waste discharges from SBPP to south San Diego Bay.

The waste discharge requirements (including effluent and receiving water limitations, prohibitions, and monitoring requirements) contained in Order No. R9-2004-0154 are based on the federal NPDES regulations, the federal technological based standards for steam electric power plant (40 CFR 123), the provisions of Clean Water Act (CWA) Sections 316(a) (thermal

discharge regulations) and 316(b) (intake structure regulations), the State Thermal Plan, the Basin Plan, the *Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy, SIP), and the *California Toxics Rule* (CTR). The tentative Order also updates the waste discharge requirements in the NPDES permit to reflect the elimination of low volume and metal cleaning wastes from SBPP to San Diego Bay in December 1997. All effluent limitations, prohibitions, or monitoring requirements contained in the tentative Order are the same or more stringent than those in Order No. 96-05.

The tentative Order also incorporates where appropriate the findings of the updated studies conducted by Duke Energy at SBPP in 2003. The studies were conducted to assess the impact of the intake structures and the discharge from the SBPP on the biological resources and beneficial uses of south San Diego Bay and to verify compliance with CWA Sections 316(a) and 316(b).

The initial version of tentative Order No. R9-2004-0154 was made available for public comment on June 25, 2004. During its regularly scheduled meeting on September 8, 2004, the Regional Board heard oral public testimony regarding the initial version of the tentative Order. Because staff was not able to fully address the large volume of written comments received on the tentative Order by the September 8, 2004 meeting date, the tentative Order was not considered for adoption by the Regional Board. During the meeting the Regional Board directed staff to make additional modifications to tentative Order No. R9-2004-054 and bring the revised tentative Order back for the Regional Board's consideration at its November 10, 2004 meeting.

The recommendations made by the Regional Board at its September 8, 2004 meeting and the subsequent changes incorporated into the revised tentative Order are discussed below:

1. <u>Relocation of Thermal Effluent Limitations Compliance Point</u>

   The Regional Board recommended shortening the time allowed for Duke Energy to achieve compliance with its thermal effluent limitations at the SBPP property line (compliance with thermal effluent limitations in existing Order No. 96-05 is inappropriately enforced at Station S2, approximately 1,000 downstream of the property line). This change in the compliance point is necessary in order for Duke Energy to fully comply with federal NPDES regulations (40 CFR 122.45 and CFR 122.41(j)(1)) that require effluent limitations to be enforced a location that is at the point of discharge and representative of the discharge. The initial version of the tentative Order granted Duke Energy up to <u>five</u> years to achieve compliance with this requirement. The Regional Board indicated that five years was too long and a more expeditious schedule was needed.

   Based on the Regional Board's recommendations, the revised tentative Order requires Duke Energy to develop, submit, and implement a Workplan to achieve compliance with its thermal effluent limitations (i.e. average daily and instantaneous maximum Delta T limitations of 15 and 25 degrees F respectively) at the SBPP property line no later than <u>three</u> years after adoption of the Order.

2. CWA Section 316(b) *Phase II* Rule

The Regional Board recommended a more expeditious time-schedule for Duke Energy to comply with the new CWA Section 316(b) *Phase II* rule (for intake structures) promulgated by the U.S. EPA on February 16, 2004. The initial version of the tentative Order allowed up to three and a half years for Duke Energy to submit a *Comprehensive Demonstration Study* (Study) for the *Phase II* rule. The Regional Board also indicated that a finding needs to be made in the tentative Order that states that the location, design, construction and capacity of the existing cooling water intake structures at SBPP fail to reflect the Best Technology Available (BTA) for minimizing adverse environmental impact as required by *Phase II* rule. Furthermore, the Regional Board recognized that the implementation of the Study would enable Duke Energy to achieve full compliance with the *Phase II* rule.

As indicated in the technical study report titled "*SBPP Cooling Water System Effects on San Diego Bay, Volume II: Compliance with Section 316(b) of the Clean Water Act for the South Bay Power Plant, August 2004*" submitted by Duke Energy, there has been significant annual losses of larval and equivalent adult fish populations from entrainment at the cooling water intake. Approximately 27 percent of the goby complex and 50 percent of the longjaw mudsucker larval source water populations are lost annually. Furthermore, approximately 13 percent of equivalent adult anchovy and 15 percent equivalent adult silverside fish populations are also lost annually due to larval entrainment losses. These losses of larval and adult fish populations due to entrainment in the SBPP constitute a significant adverse environmental impact and do not comply with the performance standards of the *Phase II* rule.

Pursuant to Section 125.95(b) of the *Phase II* rule, Duke Energy is required to perform a Study to characterize impingement mortality and entrainment, to describe the operation of the cooling water intake structures at SBPP and to confirm that the technologies, operational measures, and/or restoration measures it has selected or installed, or will install, to meet one of the five compliance alternatives listed in Section 125.94(a) of the new rule. The Study will also include proposed implementation schedules. The implementation of the Study will help minimize impingement and entrainment impacts of the power plant on the standing larval and adult fish populations in south San Diego Bay.

Based on the Regional Board's recommendation, the revised tentative Order requires Duke Energy to complete its *Comprehensive Demonstration Study* and submit a final report no later than 30 months after adoption of Order No. R9-2004-0154. The revised tentative Order also includes Findings that the existing intake structures at SBPP fail to reflect the BTA for minimizing adverse environmental impact as required by the *Phase II* rule.

3. New Copper Effluent Limitations

The Regional Board indicated that it would be appropriate to grant Duke Energy a time-schedule to comply with its new copper (total recoverable) effluent limitations. The initial

version of the tentative Order required Duke Energy to comply with the new limitations, immediately after adoption of the Order.

The final effluent limitations for total recoverable copper (4.44 µg/l – maximum daily and 3.53 µg/l – average monthly) limitations were calculated based on the *Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy, SIP) and the *California Toxics Rule* (CTR), in conjunction with recent CTR test data provided by Duke Energy.

Based on the Regional Board's recommendation, the revised tentative Order includes a time-schedule for Duke Energy to comply with these final CTR limitations for copper. Duke Energy will be required to develop and implement a Workplan for source control, pollutant minimization, waste treatment, or other measures to control copper in its discharge. Duke Energy will be provided 12 months to develop the Workplan. Duke Energy will be required to fully implement the Workplan and comply with its final CTR limitations for copper no later than 36 months after adoption of the Order.

The revised tentative Order also includes interim limitations for copper that would remain in effect until the facility is subject to the final CTR limitations, 36 months after adoption of the Order. The interim limitation requires the maximum daily concentration of copper in the discharge to not exceed the concentration of copper in the intake water by more than 2.5 µg/L.

4. Impairment of Beneficial Uses

The Regional Board directed staff to include specific findings in the tentative Order that acknowledge that the SBPP discharge has impaired the Beneficial Uses of the south San Diego Bay, in particular the area of south San Diego Bay referred to as the discharge channel, and that specific abatement and restoration measures to address the detrimental impacts of the SBPP discharge on south San Diego Bay are needed.

The discharge of once-through cooling water to south San Diego Bay has adversely impacted the Beneficial Uses within the discharge channel, particularly in the area within 1000-1500 feet of the property line. The 2003 updated 316(a) study report, *SBPP Cooling Water System Effects on San Diego Bay, Volume 1: Compliance with Section 316(a) of the Clean Water Act for the South Bay Power Plant* confirmed that certain areas of the discharge channel have detrimental impacts that are attributable to the elevated temperatures and high volumetric flow rates associated with the SBPP discharge The report indicates that up to 104 acres of critical eelgrass habitat have been lost because of the redistribution of turbidity in the Bay due to the SBPP discharge. Furthermore, the report indicates that the overall diversity of benthic invertebrates residing in the near field stations of the discharge channel is much lower than at reference stations outside the discharge channel. The study also indicates that certain invertebrate species (including polychaete worms and amphipods) are largely absent in near field stations of the discharge channel. These species were found in abundant quantities in reference stations outside the discharge channel. The absence of these species from the discharge channel

demonstrates that these species could not survive under warm thermal regimes and were being adversely impacted.

The Beneficial Uses (as defined by the Basin Plan) that are potentially impaired due to the SBPP discharge include: Estuarine Habitat; Marine Habitat; Wildlife Habitat; Rare, Threatened or Endangered Species; Preservation of Biological Habitats of Special Significance; and Shellfish Harvesting. It is evident that the significant impacts on Beneficial Uses from the discharge of once-through-cooling water cannot be mitigated or completely eliminated except through significant reduction or termination of the discharge. The adverse impacts are a result of the individual and combined effects of the elevated temperature of the discharge and the high volume and velocity of the discharge (redistribution of turbidity). Based on the Regional Board's directive, the revised tentative Order includes Findings that state that Duke Energy will be required to take measures to abate the detrimental impacts of the SBPP discharge to the discharge channel. The Findings also state that Duke Energy will also have to propose measures to restore the Beneficial Uses of south San Diego Bay and to rehabilitate the damage caused to the biological resources of the Bay from the operation of the power plant.

The Regional Board may consider issuing a CWC Section 13267 letter to Duke Energy directing it to provide a Workplan that proposes specific abatement and restoration measures. Duke Energy would be responsible for the financial costs associated with the implementation of the measures. Duke Energy would be required to develop and implement the abatement and restoration Workplan in consultation with representatives of the USEPA, Department of Fish and Game (DFG), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), RWQCB/SWRCB, and the California Coastal Commission.

5. Removal of Special Sunset Study Requirement

Pursuant to the Regional Board's direction, the originally proposed requirement for Duke Energy to conduct a Special Sunset Study (a study to evaluate the expected impacts of any proposed reduction or termination in the volume and temperature of the discharge on Beneficial Uses of south San Diego Bay), has been removed from the revised version of the tentative Order.

SUMMARY OF SIGNIFICANT CHANGES

Following is a summary of changes and new requirements that have incorporated into tentative Order No. R9-2004-0154, with respect to the current version of the NPDES permit (i.e. Order No. 96-05):

1. Effluent Limitations:

Significant Changes:

a. Final and interim effluent limitations for total recoverable copper have been incorporated into the tentative Order (see "Discussion" section of this Staff Report).

b. The tentative Order deletes intake water credits for acute toxicity and pH.

c. The tentative Order prohibits simultaneous chlorination of multiple Units.

2. Monitoring Requirements:

Significant Changes:

a. Monthly effluent dissolved oxygen (DO) monitoring has been added. The final Order may be re-opened to include an appropriate numerical effluent limitation for DO, after adequate effluent monitoring data for DO is collected and analyzed.

b. Monthly effluent, intake, and receiving water monitoring for total recoverable copper have been added to enable demonstration of compliance with the new CTR effluent limitations for total recoverable copper.

c. Monthly effluent and receiving water monitoring for other priority metals (cadmium, lead, mercury, arsenic, chromium, silver, and zinc) have been added to the tentative Monitoring and Reporting Program (MRP), in order to comply with CTR and SIP provisions. Although the Reasonable Potential Analysis (RPA) conducted for these metals suggests that effluent limitations are not required, the RPA was based on just one sampling event. Since these metals have been found in the discharge in detectable quantities, the Regional Board determines that it is necessary to closely monitor the seasonal variation in the concentrations of these metals in the discharge over an annual cycle and periodically conduct an RPA. If an RPA, conducted in the future, demonstrates that effluent limitations are needed for these metals, the NPDES permit will be amended to incorporate these limitations.

d. Monitoring for total residual chlorine in the effluent has been increased from twice monthly to weekly. Furthermore, weekly receiving water monitoring for total residual chlorine (at two stations in the discharge channel that are closest to the property line) has been added. Weekly intake monitoring for total residual chlorine has also been added.

e. The frequency of monitoring for acute/chronic toxicity in intake and effluent has been increased from quarterly to monthly.

f. The tentative MRP deletes the requirement to monitor the bar rack approach velocity and sediment accumulation associated with the intake structures.

3. Special Studies and Compliance Workplans

a. The tentative Order includes a new requirement for Duke Energy to develop, submit, and implement a workplan to achieve compliance with its thermal effluent limitations at the SBPP property line.

Compliance of thermal discharge limitations at the property line shall be enforceable no later than 36 months after adoption of the Order. In the interim, compliance with effluent temperature limitations shall be enforced at monitoring station S1 (i.e. 1000 feet into the discharge channel).

Duke Energy shall be required to submit the workplan no later than 12 months after adoption of the Order. Progress Reports on the implementation of the workplan shall be submitted on a semiannual basis after submission of the workplan. A Final Technical Report on the implementation of the workplan will be due no later than 30 months after adoption of the Order.

b. The tentative Order includes a new requirement for Duke Energy to perform a *Comprehensive Demonstration Study* (pursuant to the CWA Section 316(b) *Phase II* rule) that characterizes impingement mortality and entrainment, describes the operation of the cooling water intake structures at SBPP, and confirms that the technologies, operational measures, and/or restoration measures that Duke Energy has selected or installed, or will install, meets one of the five compliance alternatives listed in Section 125.94(a) of the new rule.

   The Regional Board requires Duke Energy to complete its *Comprehensive Demonstration Study* and submit a final report no later than 30 months after adoption of the Order.

   Duke Energy is required to submit a *Proposal for Information Collection* prior to submittal of the *Comprehensive Demonstration Study*. The *Proposal for Information Collection* as required by Section 125.95(b)(1) of the rule will be due no later than 12 months after adoption of the Order.

c. The tentative Order includes a new requirement for Duke Energy to develop and implement a workplan for source control, pollutant minimization, waste treatment, or other measures it will be taking to control copper in its discharge and comply with its final CTR copper effluent limitations.

   Duke Energy will be provided 12 months to develop the workplan and will be required to fully implement the workplan and comply with its final CTR limitations for copper no later than 36 months after adoption of the Order. Progress reports on the implementation of the workplan will be required on a semiannual basis. A Final Technical Report on the implementation of the workplan will be due no later than 30 months after adoption of the Order.